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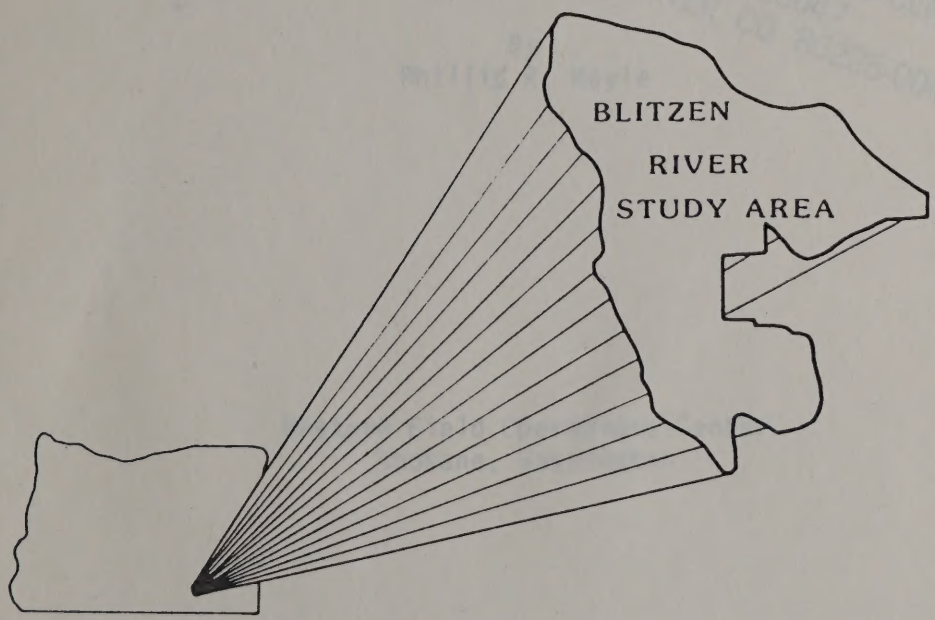
Open File Report

Mineral Resources of the Blitzen River Study Area, Harney County, Oregon



BUREAU OF MINES

UNITED STATES DEPARTMENT OF THE INTERIOR

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Natural Resources
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MINERAL RESOURCES OF THE BLITZEN RIVER STUDY AREA, HARNEY COUNTY, OREGON

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By
Phillip R. Moyle

Western Field Operations Center
Spokane, Washington

UNITED STATES DEPARTMENT OF THE INTERIOR
Donald P. Hodel, Secretary

BUREAU OF MINES
David S. Brown, Acting Director

PREFACE

The Federal Land Policy and Management Act of 1976 (Public Law 94-579, Sec. 603, October 21, 1976) requires the U.S. Geological Survey and U.S. Bureau of Mines to conduct mineral surveys on U.S. Bureau of Land Management administered land ". . . prior to any recommendation for the designation of an area as wilderness . . . to determine the mineral values, if any, that may be present . . ." Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a Bureau of Mines mineral survey of a portion of the Blitzen River Wilderness Study Area (OR-002-086E), Harney County, OR.

This open-file report will be summarized in a joint report published by the U.S. Geological Survey. The data were gathered and interpreted by Bureau of Mines personnel from Western Field Operations Center, East 360 Third Avenue, Spokane, WA 99202. The report has been edited by members of the Branch of Resource Evaluation at the field center and reviewed at the Division of Mineral Land Assessment, Washington, DC.

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UNIT OF MEASURE ABBREVIATIONS USED IN THIS REPORT

ft	foot
in.	inch
mi	mile
ppm	part per million
yd^3	cubic yard

SUMMARY

In 1986, at the request of the U.S. Bureau of Land Management, the U.S. Bureau of Mines studied 21,530 acres of the 54,960-acre Blitzen River Wilderness Study Area (OR-002-086E) in order to evaluate its identified mineral resources. The study area is 65 miles south of Burns, OR, on the west slope of the Steens Mountains; it is underlain by gently western-dipping Steens Basalt. No mines, claims, prospects, or mineralized zones were found, and no mineral or energy resources or occurrences are identified in the study area. Further studies are needed to confirm the presence and determine the extent of an inferred shallow geothermal resource at the northwest boundary of the study area.

INTRODUCTION

This report describes the USBM (U.S. Bureau of Mines) portion of a cooperative study with the USGS (U.S. Geological Survey) to evaluate the mineral resources and potential of a portion of the Blitzen River WSA 1/ (Wilderness Study Area) at the request of the BLM (U.S. Bureau of Land Management). The USBM examines individual mines, prospects, claims, and mineralized zones, and evaluates identified mineral and energy resources. The USGS evaluates potential for undiscovered resources based on areal geological, geochemical, and geophysical surveys. The USBM and the USGS investigations are summarized in a joint report used to help determine the suitability of the WSA for inclusion into the National Wilderness Preservation System. Although the immediate goal of this USBM study is to provide data for the President, Congress, BLM, and the general public for land-use decisions, the long-term objective is to help ensure that the Nation has an adequate and dependable supply of minerals at a reasonable cost.

Setting

The Blitzen River study area (fig. 1) consists of 21,530 acres of the 54,960-acre Blitzen River WSA in Harney County, OR, on the western slope of the Steens Mountains. Boundaries of the study area include the Steens Mountain Loop Road on the north, a jeep trail and the western rim of Donner Und Blitzen River Canyon on the west, and a jeep trail and section boundaries on the southeast (fig. 2). Burns, OR, is about 65 mi by road north of the study area, and Frenchglen, OR, is about 3 mi to the northwest (fig. 1).

1/ A WSA is a roadless area or island that has been inventoried by the BLM and found to have wilderness characteristics as described in Section 603 of the Federal Land Policy and Management Act of 1976 (90 Stat. 2785) and Section 2 (c) of the Wilderness Act of 1964 (78 Stat. 891).

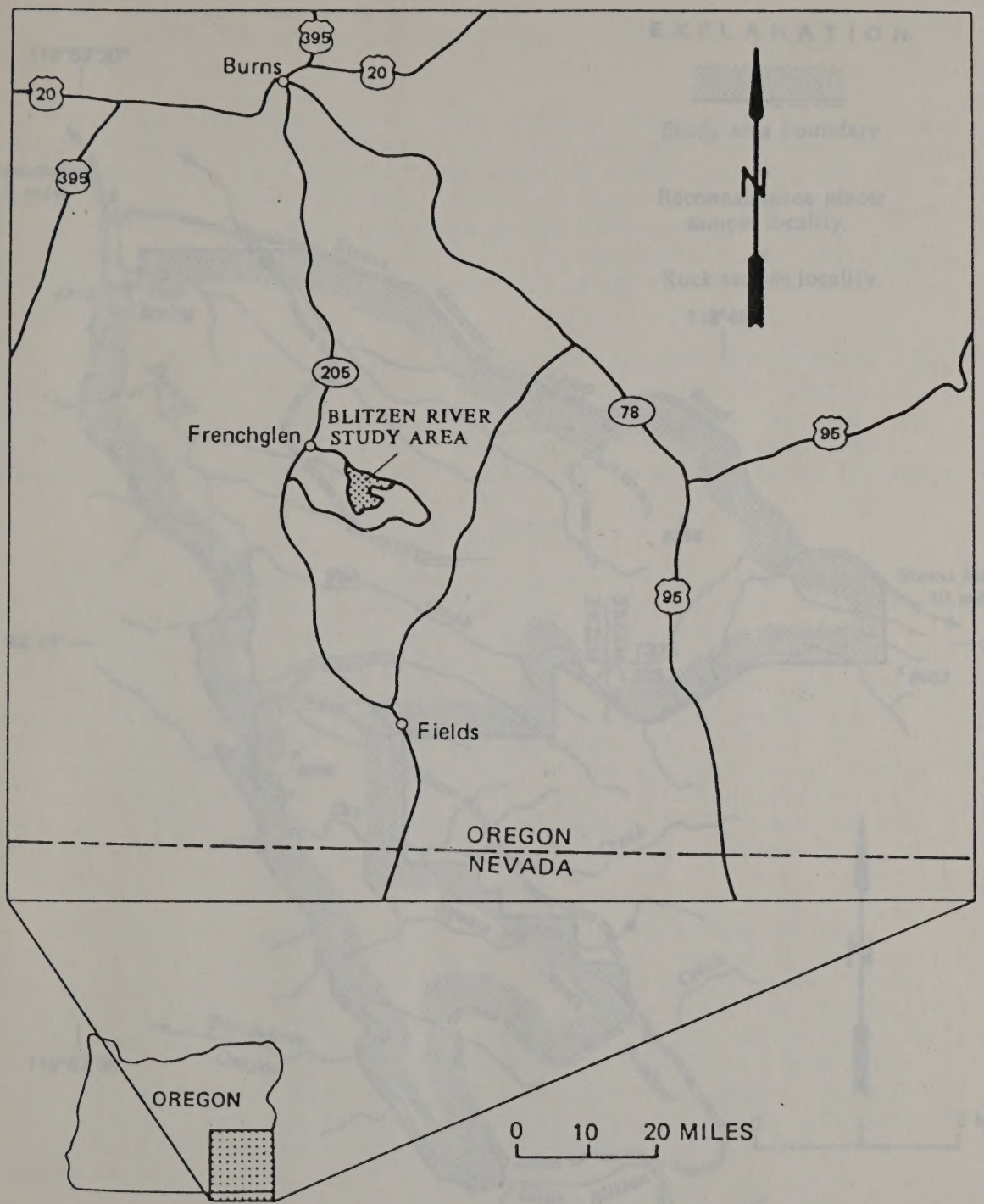

FIGURE 1.– Location of the Blitzen River study area, Harney County, OR

Burns
78
95
205
20
395
Fremont
SILVIES RIVER
STUDY AREA
Fields
OREGON
NEVADA
OREGON
0 10 20 MILES

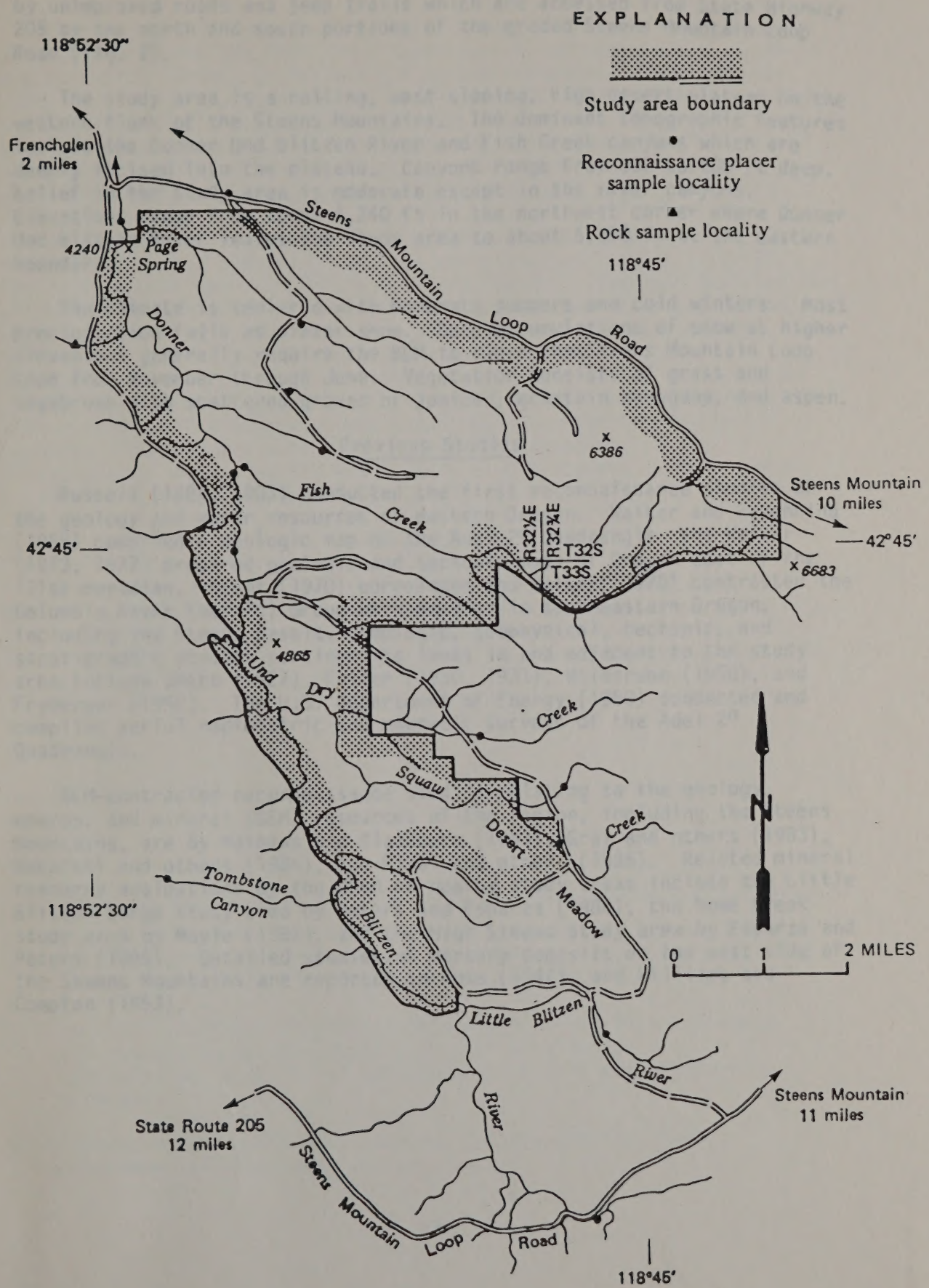

FIGURE 2.— Sample locations in and adjacent to the Blitzen River study area, Harney County, OR

The northern and southeastern boundaries of the study area are penetrated by unimproved roads and jeep trails which are accessed from State Highway 205 by the north and south portions of the graded Steens Mountain Loop Road (fig. 2).

The study area is a rolling, west-sloping, high desert plateau on the western flank of the Steens Mountains. The dominant topographic features include the Donner Und Blitzen River and Fish Creek canyons which are deeply incised into the plateau. Canyons range from 300 to 600 ft deep. Relief in the study area is moderate except in the river canyons. Elevations range from about 4,240 ft in the northwest corner where Donner Und Blitzen River leaves the study area to about 6,600 ft at the eastern boundary.

The climate is semiarid with moderate summers and cold winters. Most precipitation falls as winter snow. Deep accumulations of snow at higher elevations generally require the BLM to close the Steens Mountain Loop Road from November through June. Vegetation consists of grass and sagebrush with scattered groves of juniper, mountain mahogany, and aspen.

Previous Studies

Russell (1884, 1903) conducted the first reconnaissance studies of the geology and water resources of eastern Oregon. Walker and Repenning (1965) compiled a geologic map of the Adel 2° Quadrangle, and Walker (1973, 1977) prepared geologic and tectonic maps of Oregon east of the 121st meridian. Avent (1970) correlated and Walker (1970) contrasted the Columbia River (basalt) Group with basalts in southeastern Oregon, including the Steens Basalt. Geologic, geophysical, tectonic, and stratigraphic studies pertinent to lands in and adjacent to the study area include Smith (1927), Fuller (1930, 1931), Wilkerson (1958), and Fryberger (1959). The U.S. Department of Energy (1980) conducted and compiled aerial radiometric and magnetic surveys of the Adel 2° Quadrangle.

BLM-contracted reconnaissance studies relating to the geology, energy, and mineral (GEM) resources of the region, including the Steens Mountains, are by Mathews and Blackburn (1983), Gray and others (1983), Bukofski and others (1984), and Rimal and others (1986). Related mineral resource evaluations by the USBM of nearby study areas include the Little Blitzen Gorge study area by Peters and Esparza (1986), the Home Creek study area by Moyle (1987), and the High Steens study area by Esparza and Peters (1986). Detailed studies of mercury deposits on the east side of the Steens Mountains are reported in Ross (1942), and Williams and Compton (1953).

Present Study

Work by the USBM entailed prefield, field, and report preparation phases during 1986 and 1987. Prefield studies included library research and perusal of Harney County and BLM mining and mineral lease records. USBM and other production records were searched. Field studies involved searches for mineralized areas within the study area. Those found were sampled. Both ground and aerial reconnaissance were conducted in an attempt to identify significant geologic structures and zones of alteration where mining-related activity might have taken place.

Two select rock samples 2/ were collected, and fourteen reconnaissance pan samples 3/ of sand and gravel were taken (fig. 2). The rock samples were crushed, pulverized, split, mixed, and analyzed for gold by fire-assay/atomic absorption, for an 11 element 4/ geochemical suite by inductively coupled argon-plasma spectrophotometry organic extraction, and for zeolites and clays by x-ray diffraction. Reconnaissance pan samples, partially concentrated in the field, were further concentrated on a laboratory-sized Wilfley table. Concentrates were scanned with a binocular microscope to determine heavy-mineral content. Concentrates were also checked for radioactivity and fluorescence. Assay results are on file at U.S. Bureau of Mines, WFOC, E. 360 Third Ave., Spokane, WA 99202.

ACKNOWLEDGEMENTS

Dean Durphy, Area Manager of Andrews Resource Area, and Mark Armstrong, District Environmental Coordinator, BLM Burns District office, provided logistical support and information pertinent to the study area. Steve Robinson of the USBM, Western Field Operations Center, Spokane, WA, assisted the author in the field.

2/ A select rock sample contains pieces of rock chosen, generally from the apparently best mineralized parts of a pile or exposure, or of any particular fraction (e.g., quartz, host rock).

3/ A reconnaissance pan sample consists of one level 14-in.-diameter pan containing approximately 0.004 yd^3 of alluvium concentrated to check for the presence of gold and other heavy minerals.

4/ Antimony, arsenic, bismuth, cadmium, copper, gallium, lead, molybdenum, silver, thallium, and zinc.

GEOLOGIC SETTING

The Blitzen River study area lies on the west slope of the Steens Mountains which are at the northern boundary of the Great Basin subprovince of the Basin and Range physiographic province (Thornbury, 1965, p. 462, 484). The Steens Mountains are an uplifted fault block (horst) composed of west dipping, Miocene-age volcanic flows and volcaniclastic rocks. The range trends approximately N. 20° E., and it has a gentle western dip slope and a precipitous eastern fault escarpment. Steens Basalt, consisting of massive basalt flows with minor interbeds of tuff and scoria, is the only formation exposed within the study area. It is locally overlain by Quaternary alluvium consisting of slope wash and recent stream deposits. The Alvord Creek Formation, the Pike Creek volcanic series, and the Steens Mountain volcanic series (oldest to youngest) underlie the Steens Basalt in exposures on the eastern escarpment of the range (Fuller, 1931; Williams and Compton, 1953, p. 24) about 15 mi to the east. In the range, late Miocene tuffaceous lake sediments in places overlie flows of the Steens Basalt. Locally, the semiconsolidated lake sediments include sandstone and siltstone, ash and ashy diatomite, conglomerate, fanglomerate, slope wash, and various tuffs (Walker and Repenning, 1965).

Numerous northwest-trending, northeast-dipping normal faults with small displacement cut the study area (Williams and Compton, 1953, p. 35). A secondary set of normal faults trends northeast (Walker and Repenning, 1965).

APPRAISAL OF MINERAL RESOURCES

The Blitzen River study area is about 10 mi west of the north end of the Steens-Pueblo Mountains mining district which lies along the crest and east slope of the Steens Mountains (Bradley, 1982). Small quantities of mercury were produced from the district. Esparza and Peters (1986) identified a small marginal perlite reserve and noted occurrences of mercury, uranium, gold, molybdenum, and zeolite in or near the High Steens study area, about 5 to 10 mi east of the Blitzen River study area. They also state that the east side of the Steens Mountains meets some requirements which fit the epithermal gold deposit model.

No claims have been located, no mineral production has been recorded, and no workings are in evidence in or adjacent to the Blitzen River study area. Within the last five years, a company in search of epithermal gold deposits is known to have conducted reconnaissance sampling on the western flank of the Steens Mountains, including portions of the study area (George Brown, BLM, personal commun., 1986). The company is not known to have followed up on the work.

No gold was found in 14 reconnaissance pan samples taken by the USBM from drainages within and adjacent to the study area (fig. 2). The USBM also collected two select samples of semiconsolidated sand and gravel with an altered, tuffaceous matrix from a small outcrop exposed in the center of section 19, T. 32 S., R. 32 1/2 E. (fig. 2). The samples did not contain metallic values above normal crustal abundance for the type of rock sampled, but heulandite (a zeolite) and smectite (a clay) were detected in one sample. The amount and quality of zeolite and clay were not sufficient to warrant further evaluation as a resource. No metallic and no significant industrial mineral occurrences were found by the USBM in or near the study area.

As part of a regional mineral resource assessment for the BLM, Barringer Resources, Inc. (Bukofski and others, 1984) analyzed 1,262 stream sediment samples collected from drainages in southeastern Oregon. Ten of 58 samples taken from within or near the Blitzen River study area contained 0.02 to 0.09 ppm silver (average 0.05 ppm silver) and 4 contained 18 to 100 ppm tungsten, these being geochemically anomalous concentrations. Bukofski and others (1984, p. 76) noted that limonite-cemented rock fragments were observed in the samples with relatively high concentrations of silver. They concluded that the silver probably co-precipitated with iron oxides and not mineralizing hydrothermal solutions. They also concluded that the tungsten may be from late-stage differentiation of the source rocks for tuffaceous units.

Erickson and Curry (1977) examined uranium prospects in the nearby Steens-Pueblo Mountains mining district and observed that concentrations of oxidized uranium occur in narrow zones in and adjacent to rhyolite breccias and rhyolite dikes in the Pike Creek Formation. These occurrences are possibly associated with high-angle fracture zones. Although they noted (p. 15) that significant uranium mobilization had taken place, they also concluded (p. 10) that uranium surface shows are ". . . weak, small, and sporadic." Uranium-bearing formations are not known to crop out, and no anomalous radioactive emissions were detected in the vicinity of high-angle faults in or near the Blitzen River study area.

Three low-temperature geothermal springs which lie along the flanks of Blitzen Valley, about 2 to 5 mi northwest of the study area, range in temperature from 78 to 89° Fahrenheit, produce from 100 to 1,800 gallons per minute, and are used for livestock and irrigation (Waring, 1965, p. 40). The Oregon Department of Geology and Mineral Industries (1982) classified the area around the springs and to the northwest edge of the study area as ". . . known or inferred to be underlain at shallow depth (less than 1,000 meters) by thermal water of sufficient temperature for direct heat applications."

Oil and gas leases issued in 1982-83 for several parcels of land southwest of the Blitzen River study area were terminated in 1984-85. Lands in wilderness study areas in the Steens Mountains were assessed by Fouch (1983) as having low potential for petroleum resources; however, no geologic structures favorable for oil and gas are known to underlie the Blitzen River study area.

The host formations and depositional environments of the mineral occurrences of the High Steens are not known to be present in the Blitzen River study area. No mineral or energy resources or occurrences are identified in the study area; however, further studies are needed to confirm the presence and determine the extent of an inferred shallow geothermal resource at the northwest boundary of the study area.

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